

Adaptive Management & Shorebird Conservation in the Southeast



*FWS Region 4
Atlanta, Georgia
January 14, 2003*

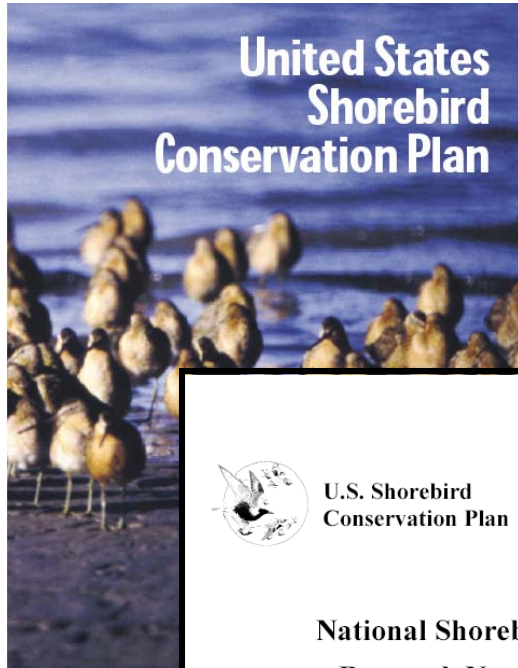


Outline

- **motivation and opportunity**
- **ARM & the analysis of management decisions**
- **relevance to shorebird conservation in the SE**
- **building the capacity for ARM**



Motivation



U.S. Shorebird
Conservation Plan

National Shorebird Research Needs

A Proposal for a National Research Program and
Example High Priority Research Topics

A Technical Report of the Research and Monitoring Working Group of the
U.S. Shorebird Conservation Plan

- **declining pops & continuing threats**
- **uncertainty about most appropriate management response**
- **management difficulties that are common to migratory birds**
- **synergy with waterfowl conservation planning & evaluation**

**COOPERATIVE AGREEMENT FOR THE ESTABLISHMENT AND OPERATION
OF THE SOUTHEASTERN ADAPTIVE MANAGEMENT GROUP**

between and among the

U.S. GEOLOGICAL SURVEY

the

U.S. FISH AND WILDLIFE SERVICE

and the

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION


U.S. Fish and Wildlife Service - Southeast Region

Date: 6/6/02


U.S. Fish and Wildlife Service - Division of Migratory
Bird Management

Date: 4/24/02


U.S. Geological Survey - Eastern Region

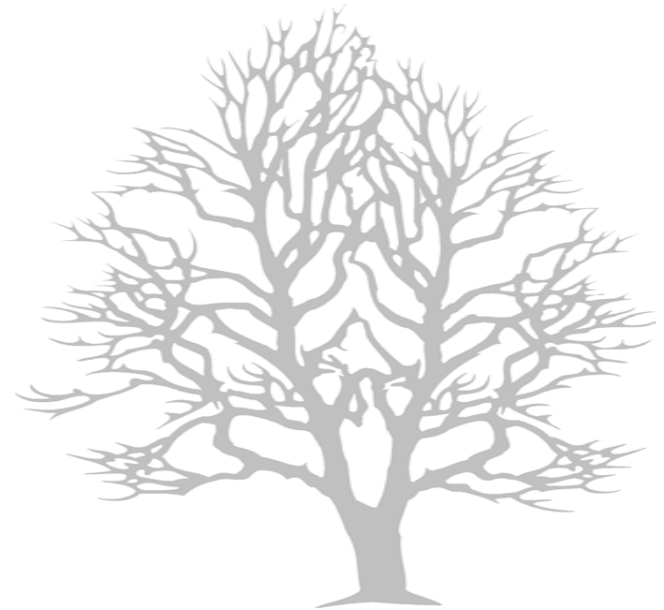
Date: 4/24/02


U.S. Geological Survey - Cooperative Research Units

Date: 4/24/02


Florida Fish and Wildlife Conservation Commission

Date: 9-May-2002



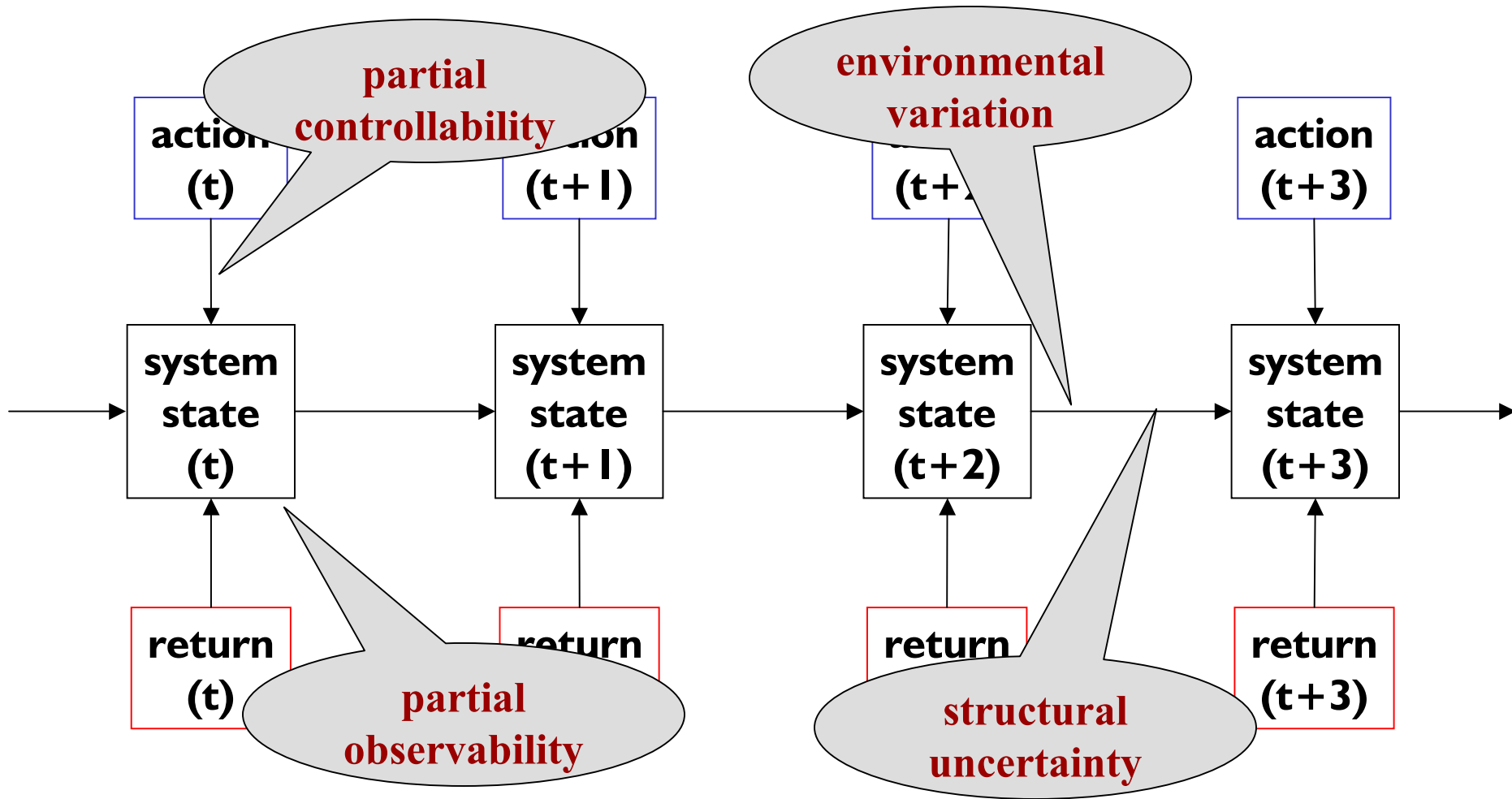
*to better integrate research and
management for the purpose of
improving how natural resource
management decisions are made*

Making management decisions

- **clearly defining management objectives**
- **specifying a finite set of alternative management actions**
- **predicting (probabilistically) the consequences of alternative actions in terms that are relevant to the stated objectives**
- **choosing the action that has the highest expected return**



Adaptive decision making



Operational elements of ARM

assessment

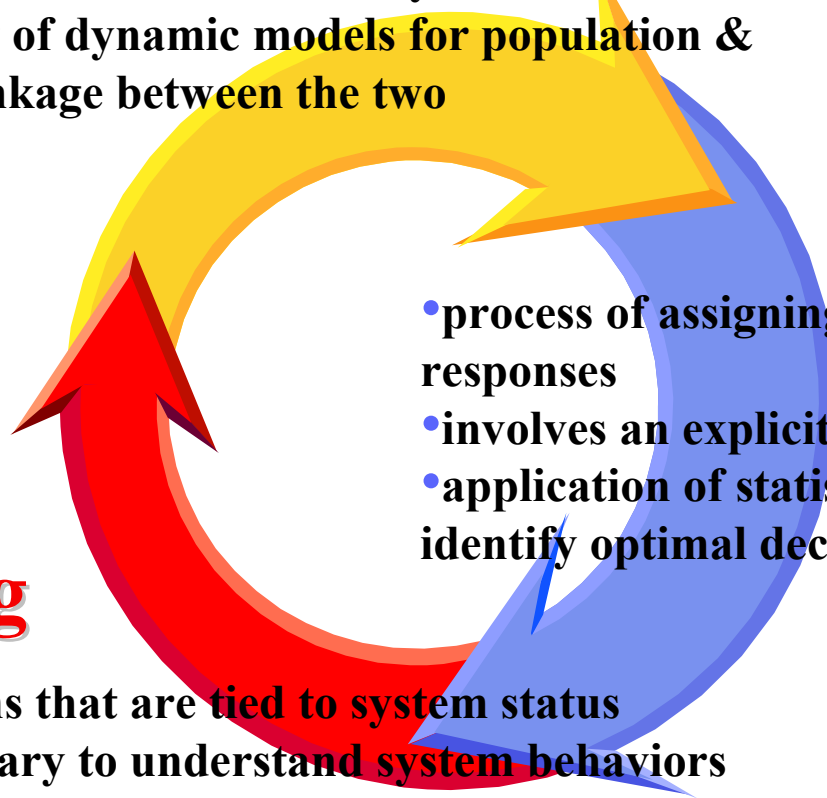
- refers to collective efforts to understand system behaviors
- involves development of dynamic models for population & habitat processes & linkage between the two

decision making

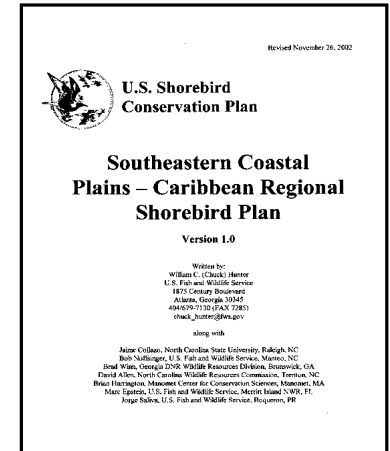
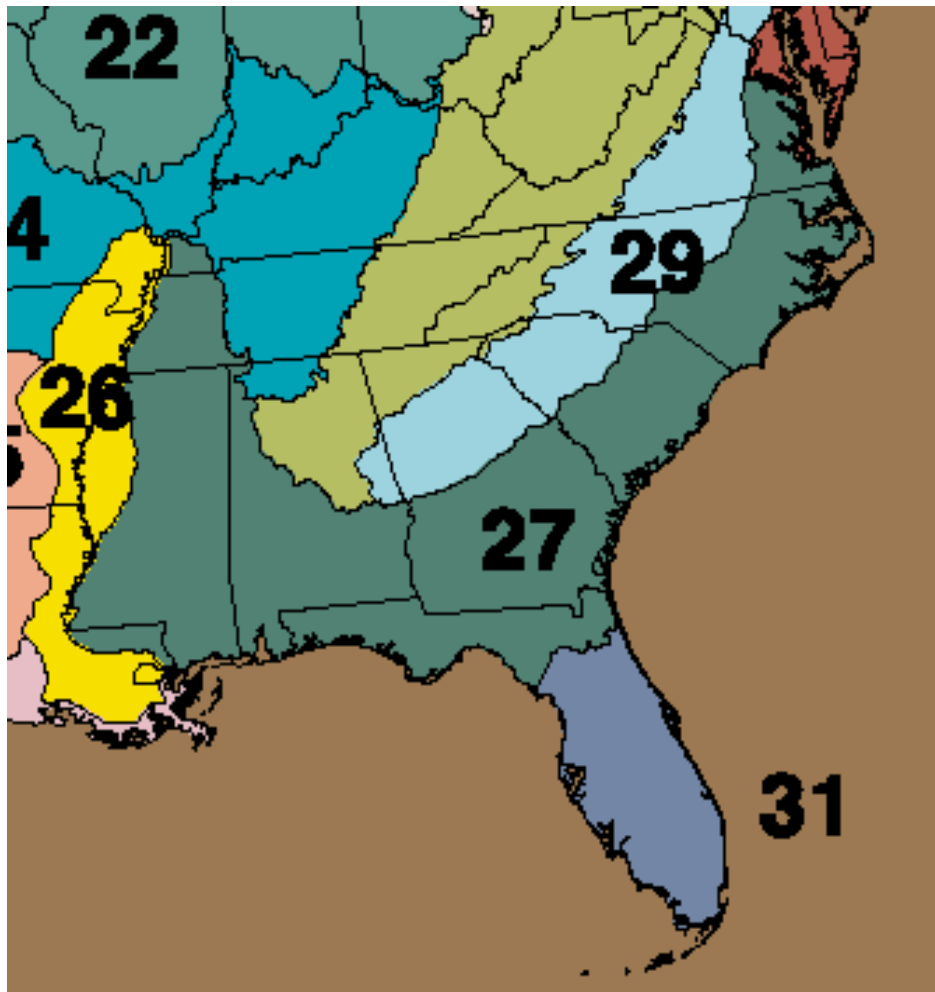
- process of assigning value to possible system responses
- involves an explicit recognition of uncertainty
- application of statistical decision theory to identify optimal decision

monitoring

- permits mgmt actions that are tied to system status
- provides data necessary to understand system behaviors and responses to mgmt
- consists of both population & habitat monitoring



ARMing shorebirds



- **Breeding**

- > snowy, wilson's, & piping plovers,
- american oystercatcher
- > beachfronts

- **Migration/wintering**

- > *Calidris* spp. (smallish sandpipers)
- > inland & managed habitats (impoundments, lakeshores, flooded cropland)



ARMing shorebirds

Beach closures / predator control



Beach re-nourishment / dredging



ARMing shorebirds

Water-level manipulation



ARMing shorebirds

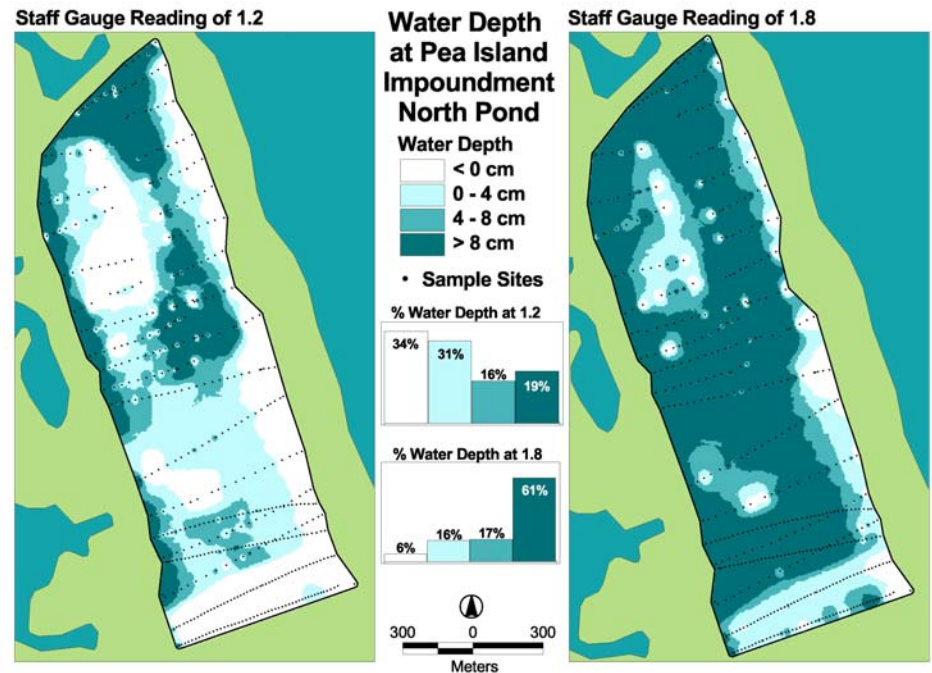
Vegetation management



Building the capacity

Monitoring component

- monitoring designs and protocols
- habitat monitoring & assessment
- database management



Building the capacity

Integrated modeling/analysis component

- demographic research
- assessment of environmental processes
- models linking population & environmental processes

N = population size
 S = survival probability
 P = recruitment rate
 Ψ = movement probability
 $(S\Psi)$ = transition probability

$$N^A = N^F (S^{FA} + P)$$

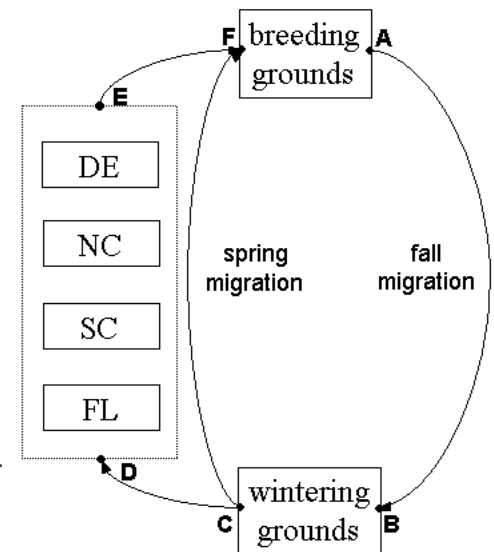
$$N^B = N^A S^{AB}$$

$$N^C = N^B S^{BC}$$

$$N^D = N^C (\Psi^{CD} S^{CD})$$

$$N^E = N^D S^{DE}$$

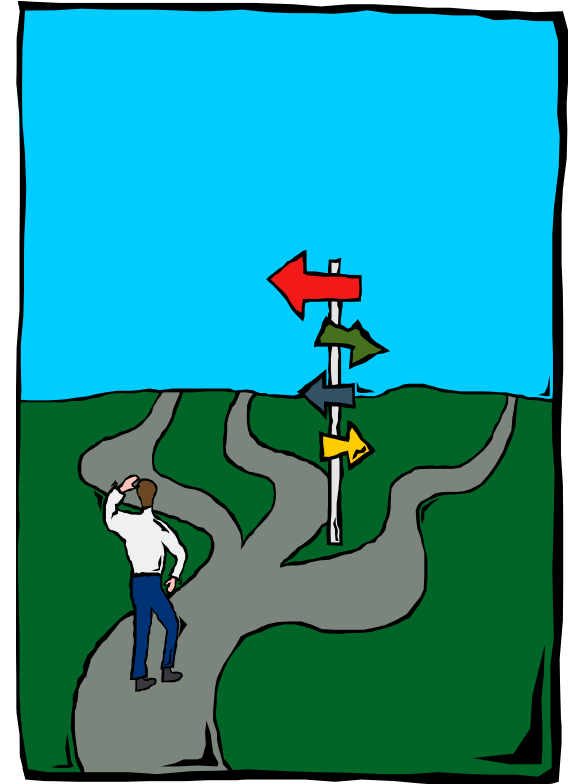
$$N^F = N^E S^{EF} + N^C (1 - \Psi^{CD}) S^{CF}$$



Building the capacity

Decision-support component

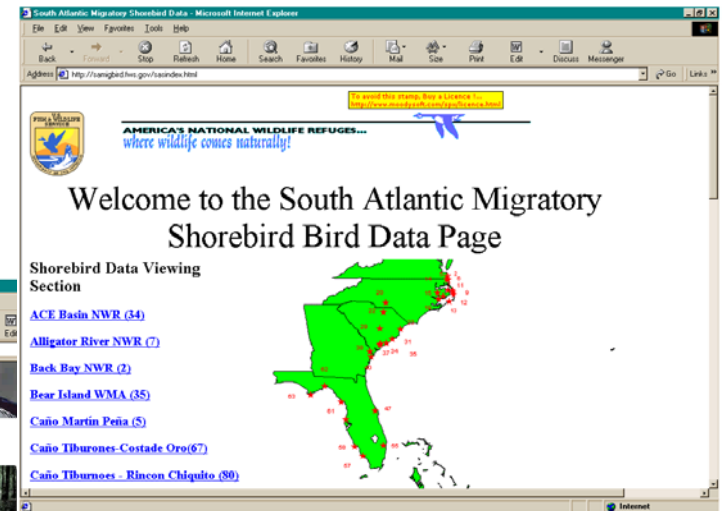
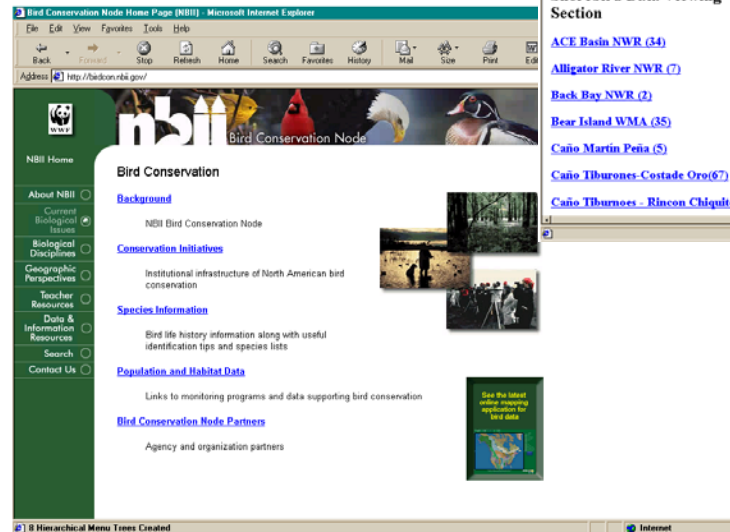
- computer-based, decision support tools
- decision analyses
- design of adaptive management strategies



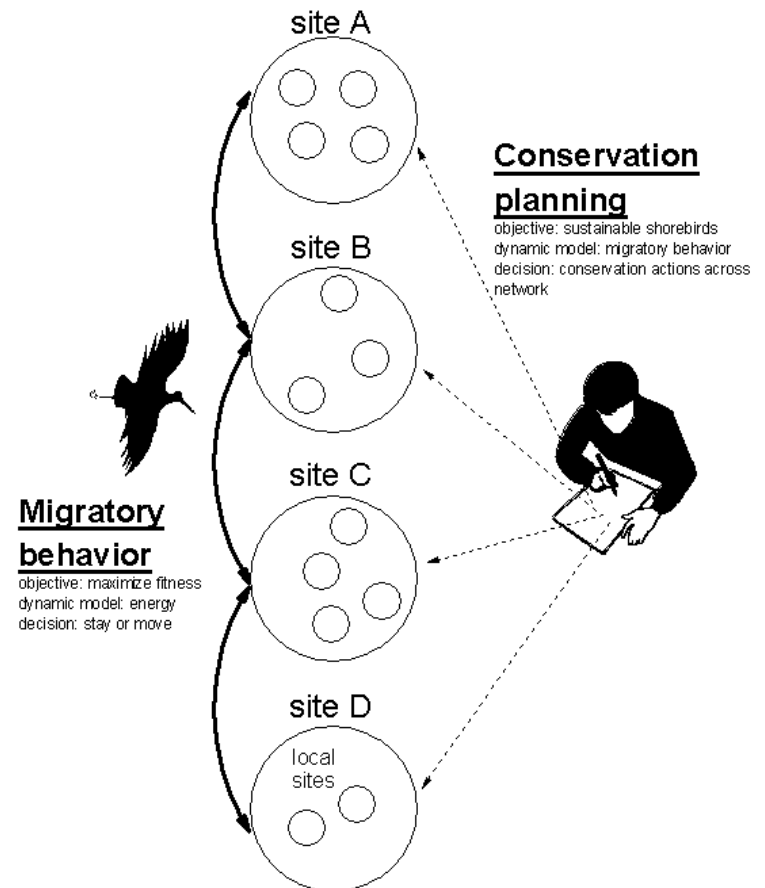
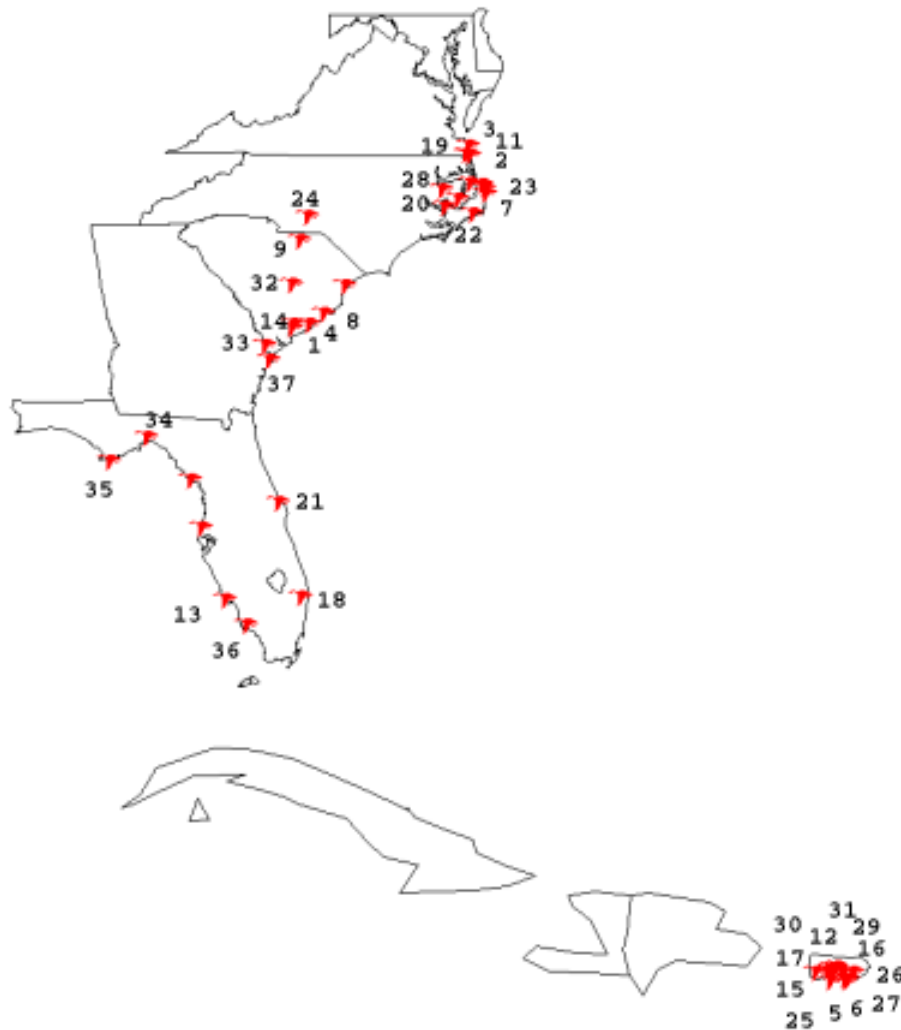
Building the capacity

Information component

- design of an information commons
- distributed network
- data synthesis

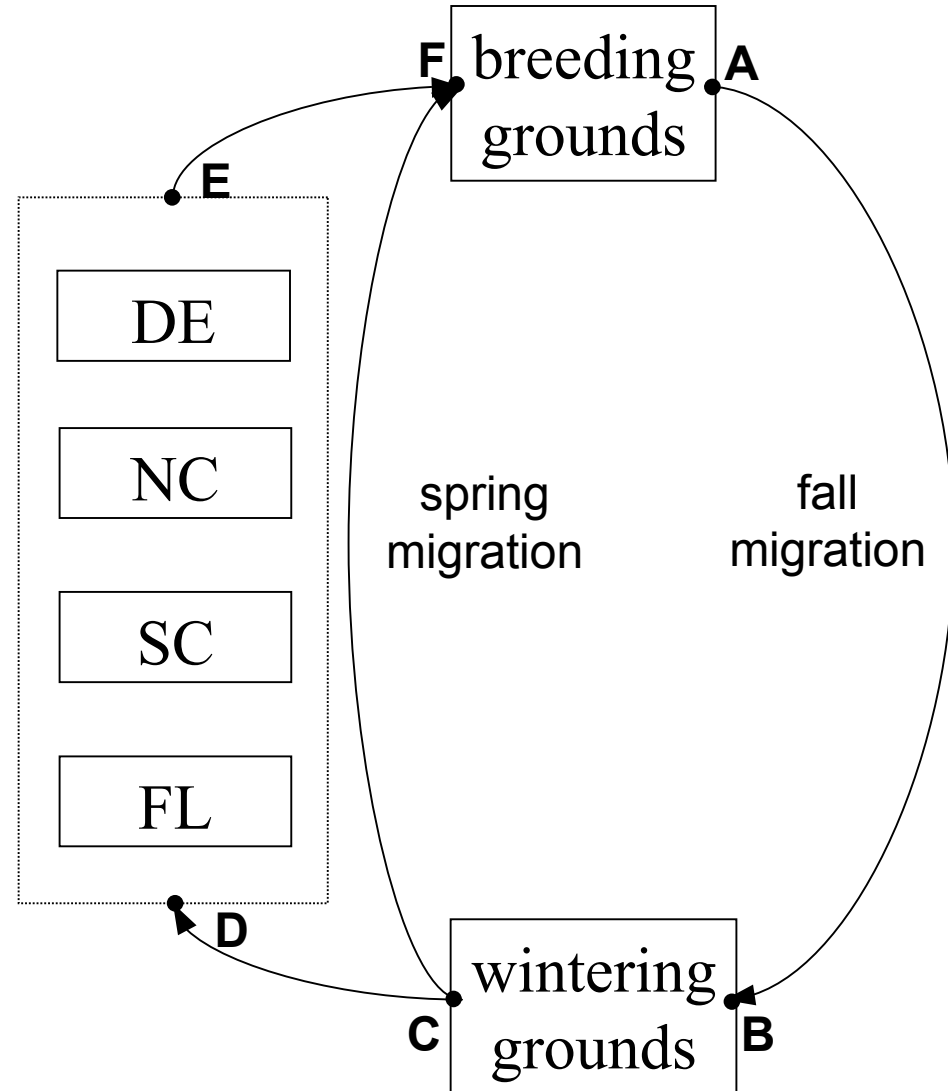
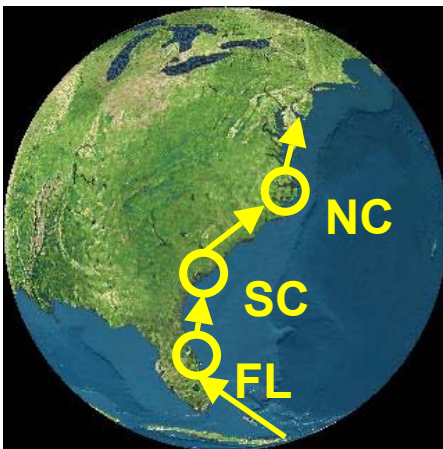


A proposed pilot program



Assessment framework for refuge mgmt

- multiple scales of system dynamics & decision making and coherent scaling
- focus on local mgmt, but with large-scale context
- explicitly includes shorebird vital rates
- used to guide decision making and monitoring & research design



Summary



- **SEAMG provides unprecedented opportunity to link management & research capabilities.**
- **Adaptive management is a systematic and iterative process of monitoring, assessment, and decision making.**
- **Opportunities for application involve beach & impoundment management.**
- **The SE Region has an existing foundation upon which to build the necessary technical infrastructure.**
- **Proposed pilot project would focus on migratory behavior and the implications for impoundment management.**

